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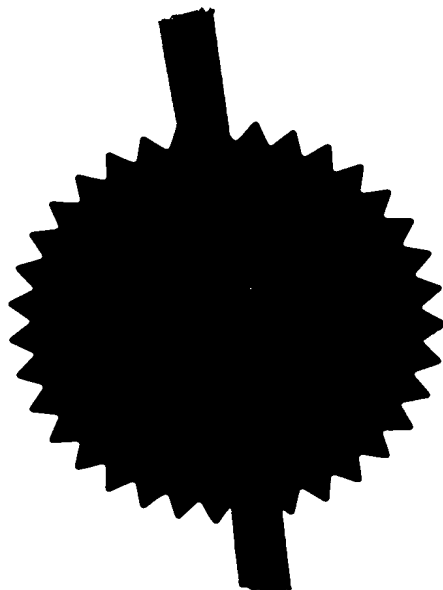
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(See the notes on the back of this form. You can also get  
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1. Your reference

PAT 97013 GB

-2 MAY 1997

2. Patent application number

(The Patent Office will fill in this part)

9708951.0

3. Full name, address and postcode of the or of  
each applicant (underline all surnames)

NOKIA MOBILE PHONES LIMITED  
KEILALAHDENTIE 4  
02150 ESPOO  
FINLAND

Patents ADP number (if you know it)

5911995004  
Finland

If the applicant is a corporate body, give the  
country/state of its incorporation

4. Title of the invention

A Radio Handset

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)

MRS HELEN HAWS  
PATENT DEPARTMENT  
ST GEORGES COURT  
ST GEORGES ROAD  
CAMBERLEY  
SURREY GU15 3QZ

Patents ADP number (if you know it)

6945539001

6. If you are declaring priority from one or more  
earlier patent applications, give the country  
and the date of filing of the or of each of these  
earlier applications and (if you know it) the or  
each application number

Country

Priority application number  
(if you know it)

Date of filing  
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7. If this application is divided or otherwise  
derived from an earlier UK application,  
give the number and the filing date of  
the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right  
to grant of a patent required in support of  
this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an  
applicant, or
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Continuation sheets of this form

Description

7 ✓

Claim(s)

2 ✓

Abstract

1 ✓

Drawing(s)

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10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

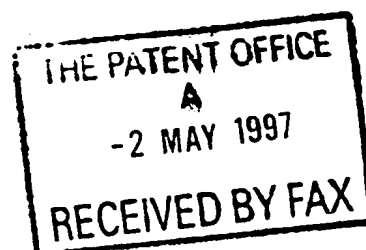
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Request for preliminary examination and search (Patents Form 9/77)

1

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)



I/W/c request the grant of a patent on the basis of this application.

11.

Signature *H L Haws*  
H L HAWS  
AGENT FOR THE APPLICANT

Date 2.5.1997

12. Name and daytime telephone number of person to contact in the United Kingdom

Mrs H Haws 01276 419346

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PAT 97013 GB

### A Radio Handset

The invention relates to a radio handset and user interface thereto.

The user interface, ie those elements of the handset that interact with the user is of vital importance. Important user interface considerations include, the ease with which the phone can be operated, the ease with which it can be transported and the comfort of use.

In the past, emphasis has been placed on designing the front of a handset, making it smaller and designing relatively large displays that allow information to be clearly presented to a user. As handsets become smaller they are better adapted for single hand operation. With this comes a range of other considerations.

Single handed operation of a radio telephone has clear advantages. These can only be realised effectively if the user finds it comfortable to operate the telephone when it is held in one hand. As modern phones are becoming increasingly small it is for the phone designer to assist in design of the phone to promote single handed operation.

In accordance with the present invention there is provided a housing component providing at least part of the rear cover of a radio handset having a front operating face including an earpiece, the component being configured to allow a laterally constrained indentation to be formed in the assembled rear cover dipping below a horizon defined by banks of the indentation which are located towards the sides of the radio telephone.

The indentation in the rear of the phone can be used to comfortably accommodate one or more of the user's fingers when the handset is placed to

the user's ear in conversation or held in the hand for dialling or other data input. As such it can be considered to be part of the user interface.

The bank surrounding the indentation is preferably arranged to support the radio handset with stability against lateral rotation on a generally planar surface. This allows the handset to be also used in the alternative for entering data when not hand held.

The location of an indentation in the rear of the phone can be used to promote a desired orientation of a handset in use. By designing the indentation to be suitably sized to comfortably accommodate one or more fingers of the user's hand, the user, who is likely to hold the handset in the most comfortable position, can be encouraged to hold the radio telephone at an optimum orientation.

The indentation is preferably located towards the end of the phone containing the earpiece/speaker to support the digits of the user's hand when holding the handset to the ear.

The invention will now be described in greater detail with reference to figures 1 to 6 of the drawings of which:-

figure 1 is a perspective view of a radio handset;

figure 2 is a top plan view of the handset of figure 1;

figure 3 is a side view of the radio handset of figure 1;

figure 4 is a rear view of the handset of figure 1;

figure 5 shows the scooped recess of figure 1 in perspective; and

figure 6 is a bottom plan view of the handset of figure 1.

Figure 1 shows a handset 1 according to an embodiment of the invention. The handset 1 comprises a user interface having a keypad 7, a display 3, an on/off button 4, an earpiece 5, and a microphone 6. The keypad has a first group 7 of keys in the form of alpha-numerical keys, by means of which the user can enter a telephone number, write a text message (SMS), write a name (associated with the telephone number), etc. The user uses the first group of keys primarily for entering data in the telephone (enter events).

The keypad additionally comprises a second group of keys which, in this embodiment, comprises an operation key 8 or soft key whose function depends on the present state of the telephone. The default function or the present function of the operation key 8 is displayed in a predetermined area of the display 3. The second group of keys additionally comprises a scroll key 9 by means of which the user can scroll selectively from one item to the preceding or the succeeding item in the menu loop of the telephone, while he gets access to a submenu loop under the item concerned in the main menu loop by activation of the operation key. The clear key 10 may be used e.g. for erasing the digit or letter entered last by brief depression, while depression of a longer duration will erase the entire number or word.

The handset may be used in connection with telephone networks, such as GSM and AMPS cellular networks and various forms of cordless telephone systems. A microphone records the user's speech, and the analog signals formed thereby are A/D converted in an A/D converter before the speech is encoded in an audio codec unit. The encoded speech signal is transferred to a physical layer processor, which, for example, supports the GSM terminal software. The processor also forms the interface to the peripheral units of the apparatus, including the display and the keypad (as

well as SIM, data, power supply, RAM, ROM, etc.). The processor communicates with an RF part via a baseband converter and a channel equalizer. The audio codec unit speech-decodes the signal, which is transferred from the processor to an earpiece via a D/A converter.

The rear cover 20 of the handset 1 is depicted in figures 2, 4 and 5. A scooped recess 21 can clearly be seen located above a battery pack 22 and extending toward the top of the rear cover of the handset 1. The scooped recess 21 is positioned substantially behind the handset's display 3 and in a position arranged to comfortably accommodate the user's fingers when the earpiece 5 of the handset is held to the user's ear.

The scoop is laterally confined by banks 23, 24 within the margins of the rear cover of the handset. The addition of a scooped recess encourages the user to hold the phone in a particular way as the feel of the phone in the hand is enhanced if one or more of the user's fingers are placed in the scooped recess. The position of the scoop can be used to encourage the user to hold the handset in a predetermined manner which can be used to enhance the operating characteristics of the radio handset particularly those related to single-handed operation of the handset.

The scooped recess improves the ergonomics of the handset. Such positioning enables the handset to be operated more comfortably by the user. It is particularly agreeable to hold the handset in one hand and operate the keys with the thumb. The natural position the hand is inclined to take when nestling a handset with a scooped recess in accordance with an embodiment of the present invention means that the alphanumeric keys and in particular the scroll key are within reach for the user's thumb as it moves naturally across the front face of the phone. No unnatural extension of the thumb along a vertical axis is required to operate the scroll key. Also, the depression of the scroll key only requires movement of the thumb from its



socket and does not require any other hand movement. Hence, the handset can be held and readily operated using the same hand.

The positioning of the scroll key 9 obliquely improves the ergonomics of the handset. Such positioning enables the key to be operated more comfortably by the user. It is particularly agreeable as the two depressible elements of the scroll key are within reach of the user's thumb as it moves naturally across the front face of the phone. No unnatural extension of the thumb along a vertical axis is required. Also, the depression of these elements of the scroll key 9 only requires movement of the thumb from its socket and does not require any other hand movement. Hence, the handset can be held and the scroll key readily operated using the same hand.

Although depicted in this embodiment located directly above the battery of the handset, the scooped recess 21 could, in other embodiments, be formed at least partly by the rear casing of the battery. The scooped recess 21 could be larger or smaller than that depicted in figures 4 and 6. The design and position of the recess is not critical, it is desirably, however, configured to accommodate finger tips of a user when holding the radio handset 1 to the ear during conversation. The position directly above the battery 22, especially if the battery catch is placed at its upper extreme as illustrated in figure 4, makes it easier for the user to depress any release mechanism for withdrawal of the battery.

The rear case surrounding the scooped recess 21 including the banks 23 and 24 is configured, for convenience to avoid lateral rocking or listing when the handset 1 is placed rear cover downmost on a generally flat surface. This ensures that data entry, can also be conveniently effected when the handset is placed on, for example, a desk ie not hand held.

To further ergonomic advantage, a second recess 26 is located towards the base of the rear cover of the handset. This could be provided together with or instead of the scooped recess at towards the top of the rear casing. This recess neatly nestles the user's palm pad at the base of the thumb promoting extra comfort when the user is operating the handset with one hand and therefore encourages this mode of operation of the handset. Alone or in combination with the scooped recess 21, this feature can have a significant effect on the natural operating position of the handset when held by a user and can, accordingly, promote a preferred position of the handset in the hand to promote single handed operation or perhaps directionality of an antenna 27.

The second recess 26 in the embodiment illustrated is generally wider laterally and shorter longitudinally than the scooped recess 21 positioned towards the top of the rear cover of the handset 1. In this embodiment, the second recess is formed partly from the profile of the housing of the battery pack 22, although in other embodiments, all or none of the second recess may be formed in the profile of the casing of the battery pack 22. The second recess 26 is seen in more detail with reference to figure 6.

The configuration of the scooped recess for this embodiment can be more clearly seen with reference to figures 2, 3 and 6. The top of the scooped recess can clearly be seen in figure 2 allowing some longitudinal rocking of the handset when placed on, for example, a table. The rear cover surrounding the recess could, however be configured to maintain the handset against both lateral and longitudinal listing. The banks of the recess defining its lateral extent can also clearly be seen in figure 2. From figure 3 it is clear that the recess of this embodiment cannot be seen in side profile promoting the lateral stability of the handset when placed on a planar surface.

The present invention includes any novel feature or combination of features disclosed herein either explicitly or any generalisation thereof irrespective of

whether or not it relates to the claimed invention or mitigates any or all of the problems addressed.

In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention.

## Claims

1. A housing component providing at least part of the rear cover of a radio handset having a front operating face including an earpiece, the component being configured to allow a laterally constrained indentation to be formed in the assembled rear cover dipping below a horizon defined by banks of the indentation which are located towards the sides of the radio telephone.
2. A housing component according to claim 1 wherein the bank of the indentation is preferably shaped to inhibit lateral pitching of the handset when placed rear cover downward on a generally planar surface.
3. A housing component according to claim 1 or 2 wherein the indentation is longitudinally constrained.
4. A housing component according to any preceding claim configured such that the indentation is formed towards one end of the assembled cover.
5. A housing component according to claim 4 configured such that the indentation is formed towards the end of the assembled cover containing the earpiece.
6. A housing component according to claim 4 configured such that the indentation is formed towards the base of the assembled cover.
7. A housing component according to any preceding claim wherein the handset includes a battery contained within a battery housing form part of the rear cover and wherein the housing component is configured such that the indentation is located adjacent the housing of the battery pack.
8. A housing component according to claim 7 wherein the battery catch is adjacent the indentation.

9. A housing component according to any one of claims 1 to 5, 7 and 8 wherein the component is configured to provide a second laterally constrained indentation towards the end of the handset remote from the earpiece.

10. A housing component according to any one of claims 1 to 5, 7 and 8 further comprising a second component configured to provide a second laterally constrained indentation towards the end of the handset remote from the earpiece.

11. A housing component according to claim 9 or 10 wherein the second laterally constrained indentation is formed partly from the housing of the battery pack of the handset.

12. A radio handset comprising a housing component according to any one of the preceding claims.

13. A radio telephone substantially as hereinbefore described with reference to figures 1 to 6 of the accompanying drawings.

Abstract

A rear cover of a radio handset having a scooped recess for improving the ergonomics of the phone for single-handed operation.

FIG. 1

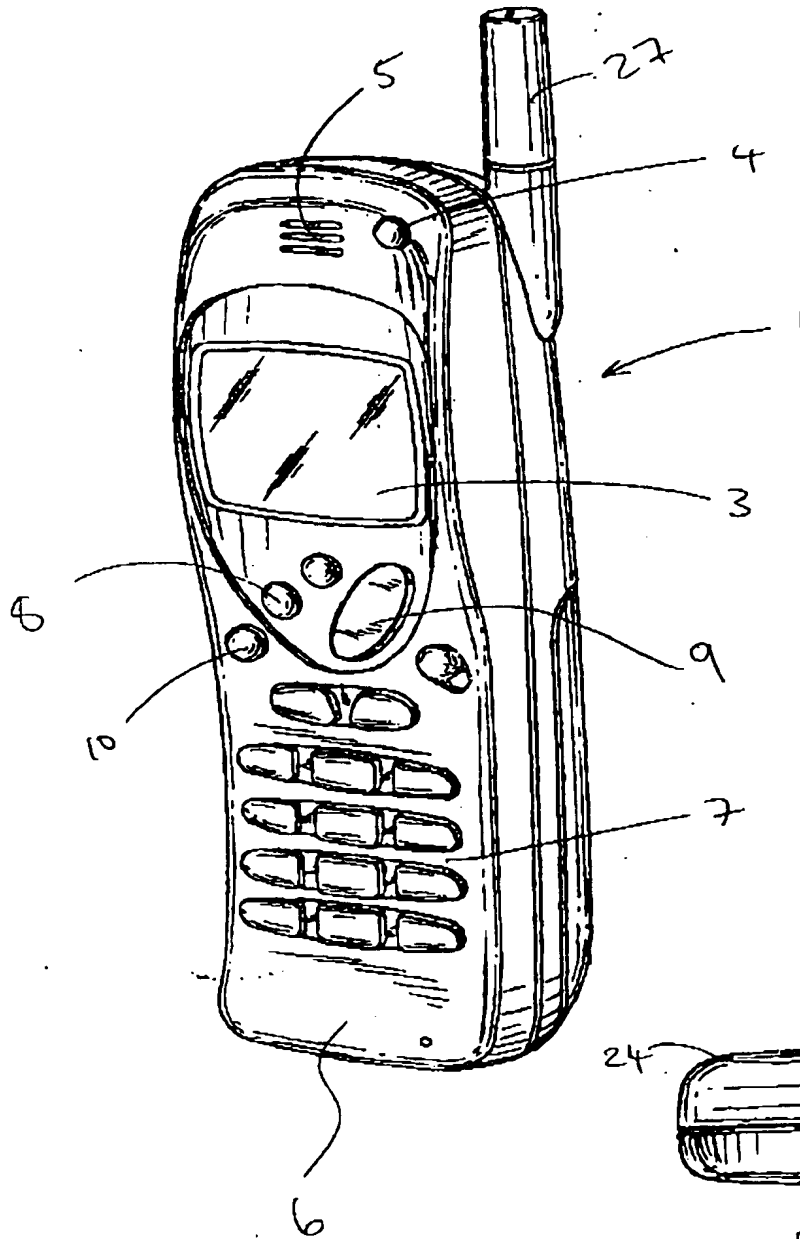
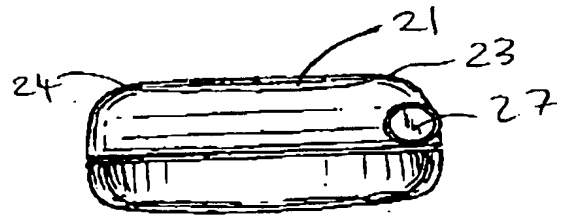


FIG. 2



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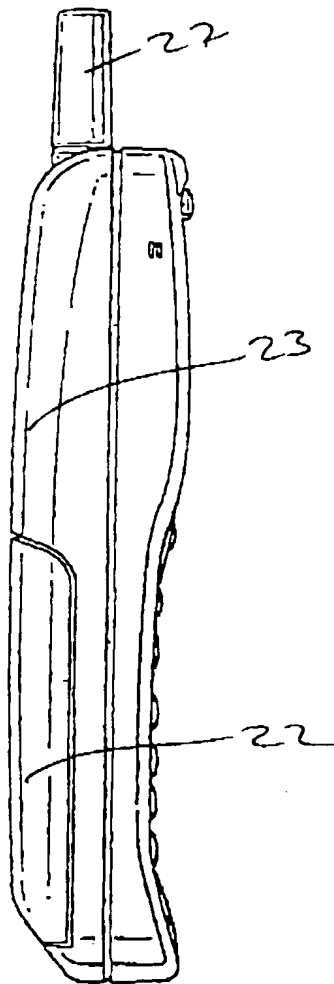


FIG. 3

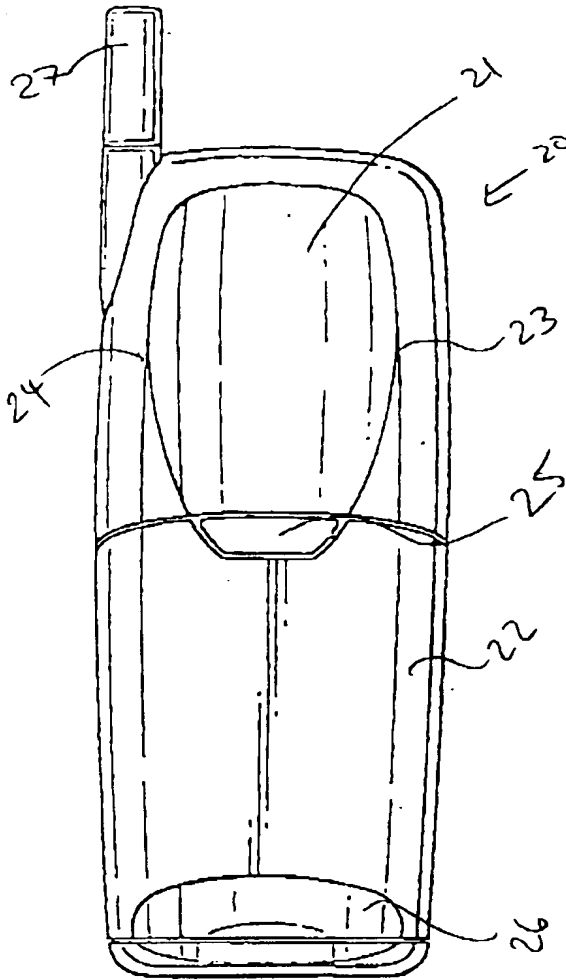


FIG. 4

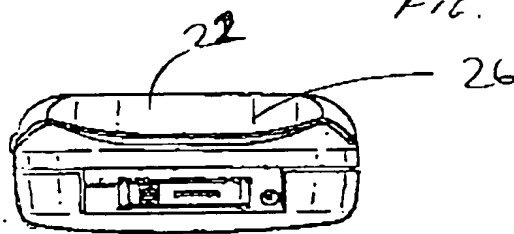


FIG. 6

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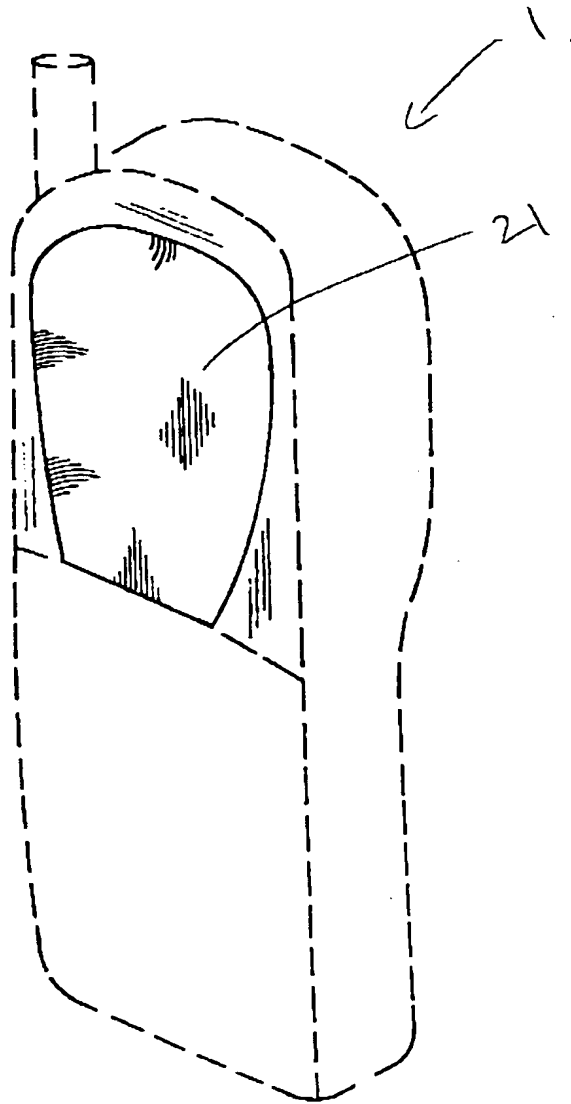


FIG. 5

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